Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
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Amendment of Part 2 of the Commission's Rules to Realign the 76-81 GHz band and the Frequency Range Above 95 GHz Consistent with International Allocation Changes	)	ET Docket No. 03-102

COMMENTS OF THE
LONG-RANGE AUTOMOTIVE RADAR
FREQUENCY ALLOCATION GROUP

I. Introduction and Summary

The Long-range Automotive Radar Frequency Allocation Group ("LARA") is an ad-hoc coalition of automotive manufacturers and equipment suppliers working to promote the continued deployment of long range vehicular radars known as adaptive cruise control ("ACC") systems in the 76–77 GHz band.[1] LARA submits these comments in response to the Notice of Proposed Rulemaking ("*Notice*") issued in the above-referenced proceeding.[2] The *Notice* requested comment on the feasibility of spectrum sharing between existing vehicular radar

[1] LARA member companies include Audi, BMW, Bosch, Continental Temic (A.D.C.), DaimlerChrysler, Delphi, Siemens VDO, TRW/Autocruise, TYCO Electronics (M/A-COM), and Volkswagen.

[2] *See* Amendment of Part 2 of the Commission's Rules to Realign the 76-81 GHz band and the Frequency Range Above 95 GHz Consistent with International Allocation Changes, ET Docket No. 03-102, *Notice of Proposed Rulemaking,* FCC 03-90 (rel. Apr. 28, 2003) ("*Notice*").

systems and three new services – radio astronomy, space research, and amateur satellite – proposed for the 76–77 GHz band.[3]

LARA has inadequate information regarding the technical operating parameters of the proposed services to conduct compatibility analyses. Therefore, LARA cannot determine with certainty the extent of sharing with ACC that would be possible. The Commission should make no new allocations in the 76–77 GHz band until it can be determined that the important public benefits provided by ACC – which the Commission has previously recognized – will not be jeopardized or limited by operation of the new services. To the extent that the Commission or other parties determine that compatibility concerns exist with regard to potential interference from ACC systems, it is critical that the Commission not react to such concerns by altering the existing vehicular radar rules. Current ACC systems – now on the market after the expenditure of hundreds of millions of dollars in development costs – are operating at the maximum power levels permitted under the rules and would be degraded if required to operate under more restrictive operational parameters. Moreover, the new services proposed to operate in the 76–77 GHz band are in a much better position than the manufacturers of ACC systems to mitigate potential interference.[4] Although limited information regarding the

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[3] *See Notice* at ¶ 13.

[4] The Commission has previously taken steps to protect important unlicensed services before introducing a new licensed service in the same band. *See* Amendment of Part 90 of the Commission's Rules to Adopt Regulations for Automatic Vehicle Monitoring Systems, *Report and Order*, 10 F.C.C.R. 4695 (1995) at ¶ 77 ("In order to limit the potential for interference [to Part 15 devices] from

proposed new services is available, sharing between those services and ACC systems operating according to the Commission's existing vehicular radar rules appears to be possible, provided that certain obligations to mitigate potential interference are imposed on the newly allocated services, and not on ACC systems.

II. ACC Systems Are Just Beginning to Realize Their Potential to Enhance Road Safety

ACC systems employ a narrow-beam[5] radar sensor, located behind the vehicle's front grill or below the bumper, which constantly monitors the distance to any vehicle traveling in front of, and in the same lane as, the host vehicle. The ACC system helps to maintain a consistent – and safe – following "time distance" by adjusting the throttle, downshifting, and even moderately applying the brakes when necessary.[6] In addition, an audible and/or visual warning indicator (*i.e.,* a Collision Warning System ("CWS")) can be integrated with the system to warn the driver of an unsafe separation distance that might result, for example, when another vehicle enters the host vehicle's lane.[7]

[new LMS] transmissions, we will limit the maximum power level of reverse links to 30 watts ERP").

[5] Both the single beam and the elevation field of view is 3°–4°. The overall azimuth field of view is 10°–15°.

[6] LARA notes, however, that current ACC systems are not collision avoidance systems, and cannot compensate for sharp, sudden decelerations of the preceding vehicle. Full breaking power cannot be used. Such capabilities may be developed in the future as part of a more comprehensive active safety system.

[7] *See, e.g.,* Mercedes-Benz USA, "Distronic Adaptive Cruise Control Feature Spotlight," available at: http://www.mbusa.com/brand/container.jsp?/search/search_list.jsp (select "D" and follow links).

As the Commission has recognized, the deployment of ACC systems serves the public interest by offering the potential to enhance road safety. In 1995, the Commission created an allocation for unlicensed vehicular radars in the 76–77 GHz band.[8] In doing so, the Commission acknowledged the wide support in the record for such action, including support from the Federal Highway Administration and the Intelligent Transportation Society of America.[9]

After a careful consideration of the emission levels that would be required to obtain adequate ACC functionality, the Commission established the following operational parameters for vehicular radar at 76–77 GHz: average power is limited to 60 $\mu W/cm^2$ at 3 meters when the vehicle is in forward motion and 200 nW/cm^2 when stationary.[10] Peak power is limited to the mean power level plus 20 dB,[11] and spurious emissions below 200 GHz are capped at 600 pW/cm^2 at a distance of 3 meters.[12]

After creating the allocation, the Commission denied a petition for reconsideration filed by the National Radio Astronomy Observatory ("NRAO") that sought more stringent spurious emission limits for 76–77 GHz vehicular radar, noting that radio astronomy observatories typically control the area within at least

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[8] *See* Amendment of Parts 2, 15 and 97 of the Commission's Rules to Permit the Use of Radio Frequencies Above 40 GHz for New Radio Application, *First Report and Order and Second Notice of Proposed Rulemaking*, 11 FCC Rcd 4481 (1995) ("*First R&O*").

[9] *First R&O* at ¶ 16.

[10] 47 C.F.R. § 15.253(b).

[11] 47 C.F.R. §§ 15.253(d); 15.35(b).

[12] 47 C.F.R. § 15.253(c)(2)(ii).

a one kilometer radius around the telescopes.[13] The Commission also determined that it would be contrary to the public interest to "depriv[e] the public of or eliminat[e] the availability of these unlicensed devices, which will enhance the safety of travel of the public via motor vehicles."[14]

The road safety benefits of ACC have been noted by the National Transportation Safety Board ("NTSB"). NTSB concluded that ACC could prevent about 12,000 rear-end collisions on U.S. interstate highways alone each year, and urged the Department of Transportation, as well as the automotive industry, to "inform the public and commercial drivers on the benefits, use, and effectiveness of CWSs and ACC."[15]

Moreover, the safety enhancing aspects of ACC have been reported by Eaton Vorad ("Vorad"), a manufacturer of ACC systems for medium and heavy duty trucks.[16] After analyzing data from 1,900 vehicles covering three years and over 1.5 billion road miles, Vorad states that it calculated an overall reduction in rear-end and lane change accidents of 78 percent. In addition, NHTSA, in conjunction with General Motors, Delphi and the University of Michigan, is currently in the midst of

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[13] Amendment of Parts 2, 15 and 97 of the Commission's Rules to Permit the Use of Radio Frequencies Above 40 GHz for New Radio Applications, *Third Memorandum Opinion and Order*, 15 FCC Rcd 10515 (2000) at ¶ 8 ("*Reconsideration Order*").

[14] *Reconsideration Order* at ¶ 9.

[15] NTSB, "Special Investigation Report: Vehicle-and Infrastructure-Based Technology for the Prevention of Rear-End Collisions," NTSB/SIR-01/01, PB2001-917003 (May 1, 2001) at 15, 33.

[16] *See* "Eaton VORAD Update 2002," www.roadranger.com/csee/MungoBlobs/2002_Eaton_VORAD_Update.pdf, (Jan. 10, 2002). Eaton Vorad is not a member of LARA.

a 10-month field operational test of ACC systems combined with forward collision warning systems. Data from this study will be available next year.

The benefits of ACC are becoming available as a result of the hundreds of millions of dollars invested by the members of LARA and other manufacturers in developing such systems. These companies were induced to invest in developing ACC technology by the Commission's decision – and similar decisions in Europe[17] – to provide an allocation for these devices at 76–77 GHz and to provide rules that allow operationally-adequate emission levels. Thus, any adverse change in the rules would improperly upset the legitimate, investment-backed expectations of the manufacturers who have contributed the capital to make this technology possible, and limit significantly its potential road safety benefits.[18]

ACC is still an emerging technology. Although available as an option on Mercedes-Benz, BMW, Audi and Jaguar automobiles since 2000, LARA

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[17] In creating the allocation for vehicular radars at 76–77 GHz, the Commission was influenced in part by the advantages inherent in international harmonization. The Commission noted that "We also foresee economic benefits, such as economies of scale and broader marketplace demand, that may be attained if both the U.S. and European markets use the 76–77 GHz band for vehicle radar systems. Accordingly, we are making this band available for use by vehicle radar systems." *First R&O* at ¶ 17.

[18] *See* Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, ET Docket No. 00-258, *Third Notice of Proposed Rulemaking*, FCC 03-16 (rel. Feb. 10, 2003) at ¶ 46 (deciding not to reallocate the 1920-30 MHz band in order not to upset the reasonable investment-backed expectations of unlicensed PCS equipment manufacturers); *see also* Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, ET Docket No. 00-258, *First Report and Order and Memorandum Opinion and Order*, FCC 01-256 (rel. Sept. 24, 2001) at ¶ 2 (deciding not to relocate MMDS/ITFS services "in order to preserve the viability of the incumbent services").

estimates that approximately 100,000 units are in operation on passenger vehicles worldwide. As noted above, studies by NHTSA and others are still ongoing to determine how ACC technology can best be deployed and used. LARA expects ACC systems to play much greater role in road safety in the future. Automotive and sensor manufacturers are already investigating the possible fusion of data from different sensors such as ACC, short range radar, cameras, and other devices to enable more sophisticated active safety applications, including, *e.g.*, the possibility of full power emergency braking.

The number of ACC systems deployed is the U.S. is expected to increase significantly over the next few years, as improvements in the manufacturing process bring down the cost of the sensors. Moreover, in Europe, which also maintains a vehicular radar allocation at 76–77 GHz, ACC is expected to become available on more modestly priced cars, such as Fiats, in the near future.[19]

III. Inadequate Information Regarding the Operating Parameters of the Proposed New Services Makes Compatibility Analysis Impossible

LARA is unable to affirmatively support the proposed allocations because LARA has inadequate information regarding the likely operating parameters of the proposed services in the 76–77 GHz band, including such details as the maximum allowed transmit power, sidelobe level limits and antenna receiver sensitivity. The Notice provided little information in this regard, and LARA's own research failed to reveal relevant data for the three services:

[19] *Id.*

- Radio Astronomy. Current ITU recommendations regarding protection criteria are unrealistic, as they assume theoretical telescope receiver performance levels that have never been achieved.[20] Realistic sharing criteria should be based on actual, not theoretical, receiver capability.

- Amateur-Satellite. A September 2002 contribution of the International Amateur Radio Union to the ITU's Working Party 8A provides representative technical and operational characteristics of systems in the amateur satellite service for use in sharing studies, but lists no criteria for operations above 450 MHz.[21]

- Space Research Service. The principal ITU document providing protection criteria for the SRS, ITU-R SA.609, only provides data for earth stations operating up to 20 GHz.[22]

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[20] *See, e.g.,* Recommendation ITU-R RA.769-1. For example: (1) ITU-R RA.769 assumes atmospheric absorption to be 0.04dB/km while the normal value is 0.4dB/km. The theoretical value has no water vapour content; only the oxygen part of the absorptions is considered. This assumption is likely unrealistic and can only occur during very cold winter nights; (2) The values in ITU-R RA.769 are based on non-fluctuating noise floors which means that amplifiers have no gain/noise figure variation during the observation time of 2000s (continuum observation); (3) Terrestrial noise coming into the receiver is not considered. This factor becomes relevant for low elevation angles; (4) ITU-R RA.769 uses a far field antenna pattern which is inappropriate for vehicular radar analysis. Far field at 77GHz for a 50m dish starts at 1300km ($>2D^2/l$).

[21] *See* International Amateur Radio Union, "Working Document Towards a Draft New Recommendation Characteristics of Systems Operating in the Amateur and Amateur-Satellite Services for Use in Sharing Studies," Doc. 8A/224-E (Sept. 9, 2002). The Commission is also apparently at a loss as to what operational characteristics to assume for amateur satellites operating in the gigahertz bands. *See* Amendment of Part 15 of the Commission's Rules to Allow Certification of Equipment in the 24.05-24.25 GHz Band, ET Docket No. 98-156, *Memorandum Opinion and Order*, FCC 03-1754 (rel. July 21, 2003) at ¶ 3 (noting the "uncertain operational characteristics of future amateur satellites" in the 24.0–24.05 GHz band).

[22] *See* "Protection Criteria for Telecommunications Links for Manned and Unmanned Near-Earth Research Satellites," ITU Recommendation 609-1.

Before any new allocations are finalized, LARA believes that realistic sharing criteria for the three services, specific to the 76–77 GHz band, should be made available for public review and comment.

IV. Sharing Might Be Possible with the Proposed Services Allocations, and Under No Circumstances Should It Be Necessary to Impose Limitations on Vehicular Radar Operations

In the *Notice*, the Commission proposed to amend the U.S. Table of Allocations to conform with a realignment of spectrum allocations adopted in 2000 at the World Radiocommunication Conference ("WRC-2000"). In the 76–77 GHz band, the Commission proposed to add a primary allocation for the radio astronomy service ("RAS") and secondary allocations for amateur satellite and space research service (downlinks).[23] Below, LARA discusses, for each of the proposed new allocations and based on the limited information available, the reasons that might make sharing feasible.

A. Radio Astronomy

A number of operational characteristics suggest that vehicular radar/RAS sharing might be feasible in the 76–77 GHz band:

- According to the Inter-Union Commission on the Allocation of Frequencies for Radio Astronomy and Space Sciences ("IUCAF"), the number of millimeter-wave observatories is expected to remain limited due to costs and the relative

[23] With regard to the existing primary allocation at 76–77 GHz for the radiolocation service, LARA notes the Commission does not have radiolocation service rules in effect for this band, meaning that radiolocation operations are currently not permitted. Moreover, NTIA's Federal Long Range Spectrum Plan indicates no government radiolocation operations in this band.

lack of suitable sites.[24] The preferred locations for such observatories are high elevations in a desert environment.[25] In the *Notice*, the Commission observed that constraints on services sharing spectrum bands with RAS should be "minimal" given that "RAS millimeter wave receivers are usually located on high mountains in order to escape atmospheric absorption of incoming signals from space."[26]

- The 76–77 GHz band does not appear on the long list of "radio frequency lines of the greatest importance to radioastronomy," contained in the *Handbook on Radio Astronomy* published by the International Telecommunication Union ("ITU").[27] This suggests that there may be limited interest by RAS observatories in making observations in this band, further reducing the number of sites that will require protection.

- As the Commission recognized in the *Notice* and in previous orders:

> "radio astronomy entities typically control access to their telescopes at a distance of at least one kilometer to provide protection from interference caused by automobile spark plugs and other uncontrolled RFI sources. This implies that radio astronomy observatories could tolerate low-powered emissions, as long as they are not in close proximity to their telescopes."[28]

The evidence suggests that in most cases RAS observatories control access over a wider area than the 1 km radius cited by the Commission. Moreover, as detailed above, mm-wave telescopes in particular are likely to be located in

[24] *See* "Frequency Sharing Between The Radio Astronomy Service and Terrestrial Operation in the Fixed and Mobile Services at Frequencies Above 71 GHz," Contribution of IUCAF to ITU-R Working Party 7D, Doc. 7D/11-E (Feb. 17, 1998) at 1 (concluding that "there is but low risk that these [mm-wave] instruments will ever become numerous") ("*IUCAF Sharing Guidelines*").

[25] *Id.* (explaining that sites are selected "on the basis of 1) stable climate, 2) low water vapor content of the atmosphere ... , and 3) height of the site and a low column density towards the zenith"). *See also, infra*, note 29 (describing siting plans for a new mm-wave observatory in California).

[26] *Notice* at n.20.

[27] ITU, *Handbook on Radio Astronomy* (Radiocomm. Bureau 1995) at 13 ("*RAS Handbook*"). The nearest frequencies listed appear at 72 GHz and 86 GHz.

[28] *Notice* at ¶ 13; *see also Reconsideration Order* at ¶ 15.

remote areas where it will likely be easier to control access to the observatory.[29]

- ACC radar sensors are mounted less than one-half meter above the ground. This low height greatly increases signal attenuation attributable to ground clutter. This ground clutter is especially effective given the relatively flat (3°-4°) antenna elevation beamwidth that results in limited above-horizon radiation.

- Because of the narrow beam width of both SRRs and radio telescope receiving antennas, and the unlikely aiming of the telescope at points near the horizon, there is a very low potential for mutual coupling that would result in interference.

- As the Commission has noted, interference mitigation for RAS can be accomplished through the erection of fences and other local shielding.[30] The IUCAF has also recognized that "it may be possible to provide local shielding at the RAS station to minimize incoming signals," in addition to relying on surrounding terrain.[31]

- At 76 GHz, radio wave propagation is essentially line-of-sight. Given the highly-directional, narrow beam of ACC systems, an ACC-equipped vehicle would have to point directly at a radio telescope to cause interference.[32] Moreover, diffraction losses caused by the earth's curvature are high at this frequency.[33]

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[29] LARA notes that planning is well underway for a new mm-wave telescope to replace the existing Owens Valley, CA radio astronomy observatory, whose elevation is too low for optimal observations. Entities involved in the Combined Array for Research in Millimeter Astronomy ("CARMA") have identified a preferred site located 12 miles from Big Pine, CA in the Inyo mountains. The remote 44-acre site would be accessible only by dirt roads. *See* http://www.mmarray.org/.

[30] *See Reconsideration Order* at ¶ 8.

[31] *IUCAF Sharing Guidelines* at 5.

[32] *See RAS Handbook* at 37 ("Sharing with active services above about 40 GHz will be easier than at lower frequencies for several reasons. First, high transmitting directivity is easily achieved at these frequencies with antennas of modest size; secondly, the atmospheric attenuation is higher at these frequencies; and thirdly, the scattering of signals by the troposphere decreases with increasing frequency.")

[33] As a result, there should be no concern regarding aggregated interference from multiple ACC systems distributed over a large area, as any emissions received at the RA receiver will be dominated by the few closest emitters. As noted above, site

As the list delineated above suggests, interference mitigation measures for radio astronomy are best designed and implemented on a site-by-site basis, rather than by any broadly-applicable rule. Moreover, the RAS observatories are themselves in the best position to protect their own operations.[34] Accordingly, the Commission need not, and should not, impose any additional limitations on ACC operations if it decides to make the proposed RAS allocation. To the extent that sharing issues arise, the Commission should impose obligations to mitigate interference on the RAS operations themselves, or otherwise limit such operations in a manner that ensures that they can coexist with vehicular radar operating pursuant to existing rules.

B. Amateur Satellite

LARA does not expect that there will be amateur satellite operations above 76 GHz anytime in the foreseeable future.[35] According to the Radio Amateur Satellite Corporation ("AMSAT"), 24 GHz is the highest frequency in use in the amateur satellite service, and this frequency is currently only available as a downlink on one satellite.[36] Indeed, most of the twenty domestic and foreign amateur satellites that AMSAT reports as operational use frequencies below 438

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specific mitigation techniques can prevent these "few closest" emitters from causing harmful interference.

[34] *See supra* note 4.

[35] Currently, Section 97.303 of the Commission's rules – promulgated to ensure the protection of vehicular radar systems – would prohibit amateur-satellite operations in the 76–77 GHz band even if the allocation were made.

[36] *See* AMSAT, "Amateur Satellite Frequency Guide" (April 2003).

MHz. In comments filed in 1998, AMSAT explained that amateur satellite designers must avoid using higher frequency bands because the higher bands "present too great a challenge to people in poorer countries" (presumably due to the greater expense of equipment capable of operating at the higher frequencies).[37] These factors suggest that it would be extremely premature to allocate spectrum in the 76–77 GHz band for amateur-satellite operations at this time.

Even if amateur satellite operations eventually did appear in the 76–77 GHz band, it is unlikely that harmful interference would be caused by the presence of ACC operations in the band. Amateur satellite antennas are typically highly directional and pointed skyward, while vehicular radars are located very near the ground, resulting in their narrow and flat beamwidth emissions being highly attenuated by ground clutter.[38] However, LARA is concerned that, absent appropriate power limitations in the service rules, earth-to-space amateur satellite transmissions pose the potential to cause harmful interference to ACC systems. Part 97 permits amateur stations to operate at up to 1.5 kW PEP, unless otherwise specified.[39] Assuming maximum transmitting power on earth station antennas positioned at low elevation angles, sidelobe emissions could extend to the ground, at

[37] Comments of the Radio Amateur Satellite Corporation, filed in RM-9267 (Jun. 1, 1998) at 3. AMSAT also commented that overcrowding in the lower bands (*e.g.*, 145 MHz), is effectively forcing amateur satellite operations up to the 435-438 MHz band, again suggesting that even newer satellites would operate at frequencies far removed from the millimeter wave band. *Id.*

[38] *See ETSI System Reference Document* at 14 ("Due to the low antenna installation height, the low power density, and the narrow vertical beam width, the potential interference (e.g., with airborne or satellite systems) is anticipated to be very low.")

[39] 47 C.F.R. § 97.313(b).

a level more than sufficient to cause harmful interference to vehicular radar. For this reason, should the Commission implement the proposed amateur-satellite allocation, it should impose specific power limitations for amateur-satellite operations in this band, as it has done in selected other bands.[40]

C. Space Research Service (Downlinks)

As an initial matter, LARA questions the need for adding the proposed U.S. allocation for space-to-earth links in the space research service ("SRS"). LARA was unable to locate any information explaining why spectrum in the 77–81 GHz band is required for this service.[41] Moreover, because the SRS allocation is proposed on a secondary basis, the extent of SRS operations in this band may be limited by the need to protect the proposed primary radio astronomy allocation. Indeed, the Commission sought comment in the *Notice* on the viability of RAS and satellite downlinks sharing the same band, stating that "[t]ypically, there are spectrum sharing concerns between RAS and the satellite downlink services . . .

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[40] *See, e.g.,* 47 C.F.R. § 97.313(c)-(h).

[41] A document from the Jet Propulsion Laboratory states that, although data rates of over 4 Gb/s can be achieved using the existing 1 GHz SRS allocation at 37-38 GHz, future space VLBI missions requiring higher data rates "will most likely be forced to higher frequencies (W-band, somewhere in the range of 74-84 GHz) and/or the use of greater dimensioned [quadrature amplitude modulation]." This analysis falls short of concluding that 77-81 GHz band will be required and it even suggests that alternative modulation techniques may make use of the band unnecessary. *See* J.C. Springett, "Achieving Future Space Very Long Baseline Interferometry Gigabits-per-Second Data Rates (May 15, 2002) at 2, available at: ipnpr.jpl.nasa.gov/tmo/progress_report/42-149/149G.pdf.

because the satellite downlink services can transmit downward directly into sensitive RAS antennas."[42]

Nevertheless, should the Commission proceed with the proposed allocation, LARA believes that it should ensure that SRS operations are limited in a manner that makes it unlikely that they would be negatively affected by vehicular radar operations. Because the proposed allocation only provides for SRS downlinks, the only question will be whether SRS earth stations can be located in a manner that ensures that they will not be subject to vehicular radar emissions. LARA understands that relatively few earth stations are typically involved in SRS operations.[43] Therefore, as with radio astronomy observatories, local mitigation techniques such as shielding and control over the immediate vicinity can be imposed to ensure adequate protection.

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[42] *Notice* at ¶ 12.

[43] For example, a 1998 ITU document listed Green Bank, West Virginia and Goldstone, California as the only two current or prospective SRS earth stations in the U.S. to operate in the 32, 37 and/or 40 GHz bands. *See* Chairman, Joint Rapporteurs Group 7D-9D, "Protection Criteria for and Characteristics of Space Research Service earth Station Operating in the Bands 31.8-32.3 and 37-39 GHz," Doc. 7D-9D/26-E (Jun. 5, 1998).

Conclusion

In determining whether to add the proposed new allocations, LARA urges the Commission to avoid any changes in the rules for vehicular radars that would require such devices to operate at power levels lower than the current rules. A reduction in vehicular radar power would threaten the viability of a still-emerging technology that the Commission has already determined to be in the public interest. Although sharing between vehicular radars and the proposed new services might be possible, the Commission should only make the proposed allocations if and when it can be determined with certainty that operation of vehicular radars will not be compromised by the new services. Should interference issues arise, the Commission should take into account the fact that the new services are in a better position than vehicular radar manufacturers to mitigate such interference and impose proactive measures that the new services must take to ensure compatibility.

Respectfully Submitted,

LONG RANGE AUTOMOTIVE RADAR FREQUENCY ALLOCATION GROUP

___*/s/ Ari Q. Fitzgerald*________
Ari Q. Fitzgerald
David L. Martin

HOGAN & HARTSON L.L.P.
555 13th Street, NW
Washington, DC 20004
(202) 637-5600
Its Attorneys

Dated: August 4, 2003